

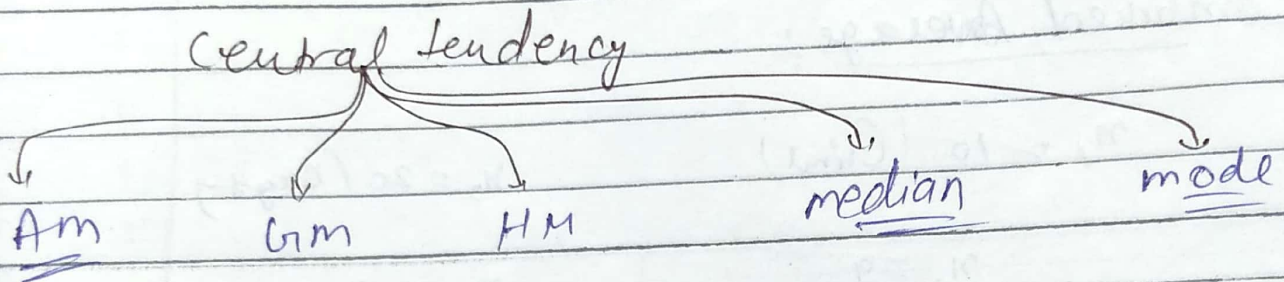
SBG STUDY

3-

12/10/17

Statistics

- ① Central tendency
- ② Dispersion



Ex 1

	nos. (n_i)
1	10
2	12
3	18
4	10
5	10
6	12
7	9
8	18
9	12
10	9

$$\bar{x} = \frac{10 + 12 + 18 + 10 + 10 + 12 + 9 + 18 + 12 + 9}{10}$$

$$= 12$$

formulae
 1 mean =
$$\frac{\sum_{i=1}^n n_i}{n}$$

② mean =

n^o	f_i
9	2
10	3
12	3
18	2

$$\bar{x} = \frac{9 \times 2 + 10 \times 3 + 12 \times 3 + 18 \times 2}{2 + 3 + 3 + 2}$$

$$= \frac{\sum n_i \cdot f_i}{\sum f_i}$$

(3) weighed mean

$$\bar{x} = \frac{n_1 w_1 + n_2 w_2 + \dots + n_n w_n}{w_1 + w_2 + \dots + w_n}$$

(4) Combined Average:

$$n_1 = 10 \text{ (Crind)}$$

$$n_2 = 20 \text{ (Bugsy)}$$

$$n_1 = 9$$

$$n_2 = 12$$

$$\text{Combined mean} = \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2} = \frac{10 \cdot 9 + 20 \cdot 12}{10 + 20}$$

x_i	f_i
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

median: 9, 3, 2, 3, 4, 9, 1, 5, 3, 2, 1

- find median

1, 1, 2, 2, 3, 3, 3, 4, 5, 9, 9

$$n = 11$$

$\left(\frac{n+1}{2}\right)^{\text{th}}$ position as median

~~$\left(\frac{11+1}{2}\right)^{\text{th}}$~~

$$\left(\frac{11+1}{2}\right)^{\text{th}} = 6^{\text{th}}$$

median = 3

②

$$n = 10$$

9, 9, 10, 10, 10, 12, 12, 12, 18, 18

$\left(\frac{n}{2}\right)^{\text{th}}$ element + $\left(\frac{n}{2} + 1\right)^{\text{th}}$ element

$$\begin{aligned} & \xrightarrow{2} \\ & \text{5th and 6th} = \frac{\left(\frac{10}{2}\right)^{\text{th}} \text{ element} + \left(\frac{10}{2} + 1\right)^{\text{th}} \text{ element}}{2} \end{aligned}$$

$$= \frac{10 + 12}{2} = 11$$

Solved ex leads
end of exercise.

Range

1, 3, 3, 7, 5, 3, 1, 4, 9, 3

$$\text{Range} = L - S$$

$$= 9 - 1 = 8$$

$$\text{Coeff. of Range} = \frac{L - S}{\frac{L + S}{2}} = \frac{9 - 1}{\frac{9 + 1}{2}} = \frac{8}{10} = \frac{4}{5}$$

* Mean deviation =

~~$$M.D = \frac{|9-12|2 + |10-12|3}{2+3}$$~~

x_i	f_i
9	2
10	3
12	3
18	2

$$M.D = \frac{|9-12|2 + |10-12|3 + |12-12|3 + |18-12|2}{2+3+3+2}$$

$$S.D = \frac{\sum |x_i - \bar{x}|^2}{N}$$

Ex!

$$n_1 = 10$$

$$n_2 = 20$$

$$\bar{x}_1 = 9$$

$$\bar{x}_2 = 12$$

$$\sigma_1^2$$

$$\sigma_2^2$$

Combined mean \bar{x}

$$\bar{x} = \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2}$$

$$\text{Combined Variance } \sigma^2 = \frac{n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2)}{n_1 + n_2}$$

$$d_1 = \bar{x} - \bar{x}_1$$

$$d_2 = \bar{x} - \bar{x}_2$$